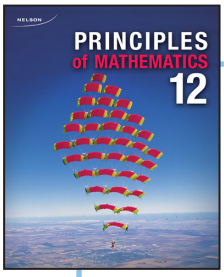


- If you have any difficulty with these solutions, please contact your teacher before continuing.

Page 428, *Reflecting*

A. i) e

ii) $y = \ln x$ is the same as $y = \log_e x$, so following the pattern for $y = \log_{10} x$, my conjecture is $x = e^y$.

iii) When $x = 5$, $\ln 5 = 1.609\ldots$ and $e^{1.609\ldots} = 5$.
When $x = 100$, $\ln 100 = 4.605\ldots$ and $e^{4.605\ldots} = 100$.

B. $x = b^y$

Page 429, *Your Turn*

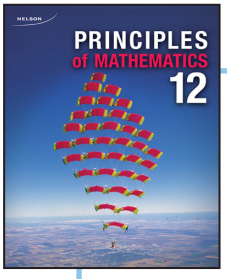
$32 = 10^y$
$\log_{10} 32 = y$ or $\log 32 = y$
$1.505\ldots = y$

Verify:

LS	RS
32	$10^{1.505\ldots}$ 32
LS = RS	

Page 430, *Your Turn*

$\log_3 27 = y$
$3^y = 27$
$3^y = 3^3$
$y = 3$
$\log_3 27 = 3$



- If you have any difficulty with these solutions, please contact your teacher before continuing.

Page 431, *Your Turn*

$$\log_5\left(\frac{1}{25}\right) = y$$

$$5^y = \frac{1}{25}$$ ✓

$$5^y = \frac{1}{5^2}$$ ✓

$$5^y = 5^{-2}$$

$$y = -2$$ ✓

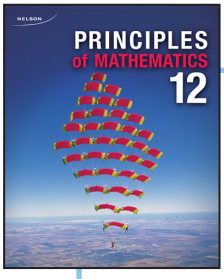
Page 432, *Your Turn*

C: $\log_2 64 = 6$ and $\log_2 8 = 3$ ✓

$\log_2 64 \div \log_2 8 = 6 \div 3 = 2$

A:5 ✓

Expression C is less than expression A because $2 < 5$.



- If you have any difficulty with these solutions, please contact your teacher before continuing.

Page 434, *Your Turn*

a. Soapy water has a pH of 12. Substitute 12 into the equation for $p(x)$:

$$\begin{aligned} 12 &= -\log x \\ -12 &= \log x \\ 10^{-12} &= x \end{aligned}$$

The hydrogen ion concentration of soapy water is 10^{-12} mol/L.

b. Seawater has a pH of 8. Substitute 8 into the equation for $p(x)$:

$$\begin{aligned} 8 &= -\log x \\ -8 &= \log x \\ 10^{-8} &= x \end{aligned}$$

The hydrogen ion concentration of seawater is 10^{-8} mol/L.

Determine the relative acidity of the solutions:

$$\frac{\text{Acidity sea water}}{\text{Acidity soapy water}} = \frac{10^{-8}}{10^{-12}} = 10^{-8-(-12)} = 10^{4}$$

Seawater is $10^4 = 10\,000$ times more acidic than soapy water is.